

REMARKS

This is in full and timely response to the Final Office Action dated August 17, 2007. The present Amendment amends claims 22-24, and 30-32 and introduces new claims 45 and 46. Support for these amendments can be found variously throughout the specification, including, for example, on page 65, lines 5-12, and in Figs. 17 and 18. No new matter has been added.

Accordingly, claims 22-38 and 40 are currently pending in this application.

In view of this response, Applicants believe that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above amendments and the following remarks are respectfully requested.

Claim Rejections- 35 U.S.C. § 103

Claims 22-25, 27, 29, 30-33, 35, 36, 38, 40 and 43-44 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over WO 02/02330 to Silverbrook ("Silverbrook") in view of U.S. Patent No. 6,270,187 to Murcia et al. ("Murcia"), U.S. Patent No. 6,270,199 to Kimura et al. ("Kimura"), and Japanese Publication No. 2002240287 to Shinobu et al. ("Shinobu").

Claims 28 and 37 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Silverbrook in view of Murcia and Kimura, Shinubo, and further in view of US Patent No. 6,309,050 to Ikeda et al. ("Ikeda").

Claims 26 and 34 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Silverbrook in view of Murcia Kimura, Shinubo, and further in view of U.S. Patent No. 6,046,822 to Wen et al. ("Wen").

Claims 26 and 34 were further rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Silverbrook in view of Murcia, Kimura, Ikeda, Shinubo, and further in view of Wen.

These rejections are respectfully traversed for at least the following reasons.

Claim 22 recites: *[a] liquid discharging method for discharging droplets from a plurality of liquid discharging portions onto a recording medium while controlling the discharging directions and angles of the droplets, the liquid discharging portions comprising a liquid chamber containing liquid to be discharged and a plurality of heating elements arranged in a predetermined direction inside the liquid chamber to generate a bubble in the liquid in the liquid chamber by the application of energy so that the liquid is discharged from a liquid discharging outlet, and the method comprising the steps of:*

obtaining information about a defective liquid discharging portion by checking the discharging states of the droplets discharged from the liquid discharging portions; and

prohibiting the defective liquid discharging portion from discharging and discharging droplets from a liquid discharging portion different from the defective liquid discharging portion while controlling the discharging direction and angle by forming a bubble generation time difference by applying a difference in energy between at least one of the heating elements and at least another one of the heating elements so as to control the discharging direction and angle of the liquid discharged from the liquid discharging outlet based on the value of the bubble generation time difference.

With respect to claim 22, neither Silverbrook ,Murcia, Kimura, Shinubo, Ikeda, nor Wen teach or suggest “*a liquid discharging method for discharging droplets from a plurality of liquid discharging portions onto a recording medium while controlling the discharging directions **and angles** of the droplets... controlling the discharging direction **and angle** by forming a bubble generation time difference by applying a difference in energy between at least one of the heating elements and at least another one of the heating elements so as to control the discharging direction **and angle** of the liquid discharged from the liquid discharging outlet **based on the value of the bubble generation time difference.***”

Page 5 of the Office Action admits that the combination of Silverbrook, Murcia, and Kimura fails to teach or suggest a liquid chamber that comprises a pair of heating elements which simultaneously generate energy for causing the liquid in the liquid chamber to be discharged from the liquid discharging outlet.

The Office Action relies on Shinobu for an inkjet head in a printer for discharging ink droplets on a printing medium to form images where the print head comprises a liquid chamber

containing liquid to be just charged a pair of heating elements arranged in a predetermined direction inside the liquid chamber to generate the bubble in the liquid in the liquid chamber by simultaneously applying different energy to the heating elements such that the difference in energy applied is formed between the heating elements to control the discharging direction of the liquid discharged from the liquid discharging outlet.

Shinobu, however, fails to teach or suggest a method for “*controlling the discharging direction **and angle** by forming a bubble generation time difference by applying a difference in energy between at least one of the heating elements and at least another one of the heating elements so as to control the discharging direction **and angle** of the liquid discharged from the liquid discharging outlet **based on the value of the bubble generation time difference.***”

Shinobu only discloses a print head capable of directing ink in a general directions, i.e., to the left and right of a print head and in line with the printhead. These general directions are illustrated in Figs. 3A-3C of Shinobu. Shinobu explains that based on the driving force applied to heaters 11A and 11B, it is possible to direct the ink to the left or right-hand side. For example, in paragraph 42, while Shinobu discloses that the ink drifts to the left-hand side, there is no discussion of controlling the specific angle of the ink application. Therefore, Shinobu does not teach or suggest controlling the angle of trajectory of the ink for the print head based on the specific difference in the “bubble generation time difference” as recited in independent claim 22.

Furthermore, Shinobu lacks the motivation to suggest controlling the discharge angle of the ink because Shinobu does not recognize the problems associated with directing ink from the print-head in a certain angle. For example, Shinobu does not recognize that the application of differently driven heating elements result in a drift in direction of the ink along the x-axis and an exponential change in the direction of the y-axis (see, for example, Fig 17 and 18 of the present application).

Additionally, neither Silverbrook, Murcia, Ikeda, Kimura nor Wen cures the deficiencies of Shinobu shown above. Accordingly, because Silverbrook, Murcia, Ikeda, Kimura, Shinobu and Wen, either alone or in combination, fail to disclose, teach or suggest each and every limitation of claim 22, a *prima facie* case of obviousness has not been established, and withdrawal of this

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rejection is respectfully requested. *See, e.g., In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); *accord.* MPEP 2143.03.

Furthermore, at least for the reasons set forth above, claims 23-24 and 30-32 are also patentable over Silverbrook, Murcia, Ikeda, Kimura, Shinobu and Wen. Moreover, aside from the novel limitations recited therein, claims 25-29, 33-38, and 40, being dependent either directly or indirectly upon allowable base claims 22-24 and 30-32, are also allowable for at least the reasons set forth above. Withdrawal of the rejection of these claims is therefore courteously solicited.

CONCLUSION

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. SON-2826 from which the undersigned is authorized to draw.

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Respectfully submitted,

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